FLORENCE COPPER

FLORENCE COPPER INC.
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florencecopper.com

November 17, 2020

Ms. Nancy Rumrill
U.S. Environmental Protection Agency, Region 9
Drinking Water Protection Services, WTR-3-2
75 Hawthorne Street
San Francisco, California 94105

Re: Proposed Annular Conductivity Device Demonstration Submitted in Support of Application for Underground Injection Control Permit, Florence Copper Project, Florence, Arizona

Dear Ms. Rumrill:

Pursuant to our telephone conversation on November 4, 2020, Florence Copper Inc. (Florence Copper) herewith transmits a description of a proposed annular conductivity device (ACD) demonstration to be conducted during commercial In-Situ Copper Recovery (ISCR) operations. This proposal is submitted in support of our application for an Underground Injection Control (UIC) Permit submitted to the U.S. Environmental Protection Agency (USEPA) on October 4, 2019 (Application). This proposal reflects our understanding of the request stated by the USEPA on November 4, 2020.

Background

Florence Copper has proposed to install ACDs on the planned ISCR wells to monitor Part 2 mechanical integrity of the ISCR wells and to monitor vertical migration of injected solution if such were to occur. The placement, use, and contingency actions associated with the ACDs are described below. The USEPA has indicated that a demonstration of the effectiveness of the ACDs would be required during commercial ISCR operations and that additional contingency actions would be required in the event that the ACDs indicated vertical migration of injected fluid.

A summary of the proposed ACD placement and monitoring is provided below as a preface to the proposed ACD demonstration and associated contingency actions.

Summary of ACD Placement and Use

ACDs Installed at Limits of Underground Source of Drinking Water (USDW)

Florence Copper has proposed to install two ACDs on each well at the limits of the exempted aquifer. One ACD will be installed at a point 10 feet below the middle fine-grained unit (MFGU), and a second ACD will be installed no more than 10 feet above the MFGU. In areas where the MFGU lies more than 200 feet above the bedrock/lower basin fill unit (LBFU) contact, an ACD will be installed no more than 190 feet

above the bedrock/LBFU contact, and a second ACD will be installed no more than 210 feet above the bedrock/LBFU contact. This placement of the ACDs above and below the limit of the exempted aquifer will provide an indication of solution migration prior to reaching the vertical limit of the Aquifer Exemption, before a hypothetical solution excursion would reach the USDW, and after a hypothetical excursion into the USDW. The ACDs will be installed at these levels on every ISCR well within the commercial wellfield.

The proposed ACD installation described above will result in two ACDs installed on every injection, recovery, observation, and perimeter well in the ISCR wellfield. ACDs will also be installed on monitoring wells (fault monitoring wells and USDW monitoring wells) constructed within the Area of Review (AOR). The location of the fault monitoring wells and USDW wells are shown on Figure A-17, and the location of the first year wellfield development is shown on Figure A-19.

Early Warning ACDs

Florence Copper has also proposed to install early warning ACDs at the bedrock/LBFU contact on 10 percent of the ISCR wells within each resource block. A typical resource block includes approximately 60 ISCR wells and would have six early warning ACDs. The early warning ACDs would be installed as follows:

1. Where mapped faults transect a resource block, four early warning ACDs will be installed approximately 10 feet above the bedrock/LBFU contact wells that are projected to penetrate the fault plane. The additional ACDs will be installed at locations distributed across the resource block at the same level and approximate horizontal even spacing.
2. Where mapped faults transect a corner or small portion of a resource block, a minimum of one early warning ACD will be installed on a well that is projected to penetrate the fault plane. The remaining early warning ACDs will be installed at locations distributed across the resource at approximate even spacing.
3. In partial resource blocks located at the edge of the Production Test Facility wellfield, an early warning ACD will be installed on at least one well if fewer than ten wells are planned for the resource block, or will be installed on 10 percent of the wells in the block if more than ten wells are planned for the resource block. ACDs installed in partial resource blocks at the edge of the wellfield will be installed in areas where mapped faults are projected or will be approximately evenly distributed across the resource block if no mapped faults transect the resource block.

The early warning ACDs installed on 10 percent of the ISCR wells will provide expanded monitoring capability to detect vertical migration of injected fluids, should any occur, and obviates the need for bulk resistivity profiling.

Contingency Actions in Response to ACD Monitoring Signals

In response to an above-background signal from an ACD installed on a single well, which indicates possible loss of mechanical integrity, complete the following contingency actions. These contingency actions apply to ACDs installed at the limits of the USDW and the early warning ACDs.

1. Remove well from service.

2. Perform standard annular pressure test to evaluate mechanical integrity.
3. Complete temperature log, nuclear magnetic resonance log, and dual induction logs to evaluate potential fluid movement outside of the well casing.
4. Repair the well.

In response to an above-background signal from individual ACDs installed on two or more adjacent wells, indicating possible mounding and upward migration of injected fluid, complete the following contingency actions. These contingency actions apply to ACDs installed at the limits of the USDW and the early warning ACDs.

1. Remove the wells from service.
2. Reduce the injection rate at adjacent injection wells by 50 percent or more.
3. Increase recovery of injected fluid at adjacent recovery wells.
4. Increase the frequency of ACD monitoring to weekly.
5. Perform standard annular pressure tests on the subject wells to evaluate mechanical integrity.
6. Complete temperature log, nuclear magnetic resonance log, and dual induction logs on the subject wells to evaluate potential fluid movement outside of the well casing.

Proposed ACD Demonstration

The USEPA has indicated that a demonstration of the effectiveness of the ACDs would be required during commercial ISCR operations and that additional contingency actions would be required in the event that the ACDs indicated vertical migration of injected fluid. The USEPA indicated that the demonstration should include comparison of ACD readings from wells completed within a resource block with ACD readings from down gradient wells completed in the LBFU. The USEPA also indicated that contingency measures should include the additional monitoring wells installed within the resource block if the ACD comparison indicates vertical migration of injected fluid.

In response to this request, Florence Copper proposes the following ACD demonstration and contingency actions in addition to those described above. The proposed demonstration will be conducted 6 months after injection begins in the first resource block to be activated. This period of time will allow the flow field to fully develop and to allow the injected solution to mature.

Early Warning ACD Analysis (Demonstration)

1. Six months after injection begins at the first resource block to be activated, conduct a statistical comparison of the average ACD readings from the early warning ACDs in each resource block against the average readings from the population of ACDs installed on down gradient monitoring wells completed within the LBFU (USDW monitoring wells, and fault monitoring wells). The comparison will identify statistically significant decreases in resistivity in the ACD dataset for each resource block relative to the population of down gradient wells completed in the LBFU.
2. Six months after injection begins at the first resource block to be activated, perform statistical analysis of early warning ACD readings in each resource block to identify statistically significant changes from baseline values. This comparison will consist of evaluating early warning ACD

readings at individual wells against the population of baseline early warning ACD readings within that resource block. This analysis will identify decreasing resistivity trends developing in the ACD dataset between subsequent monitoring events if such were to occur.

Prior to conducting the ACD demonstration, Florence Copper will install two monitoring wells in the first resource block to be developed and brought online. The wells (M72-UBF and M73-LBF) will be sited based on the location of known faults and/or areas of known higher fracture intensity. Well M72-UBF will be completed in the upper basin fill unit, with a 10-foot well screen installed within 20 feet of the top of the MFGU. Well M73-LBF will be completed in the LBFU, with a 10-foot well screen installed within 20 feet of the bottom of the MFGU. The approximate locations of monitoring wells M72-UBF and M73-LBF are shown on the revised version of Figure A-19.

Early Warning ACD Analysis Contingency Actions

If the comparison of the population average ACD readings for the resource block and the down gradient ACDs shows a statistically significant increase within the resource block, Florence Copper will implement the following contingency actions:

1. Review the ACD data trends for each of the early warning ACDs installed within the resource block to identify the area where the greatest decrease in resistivity has occurred as described above in step 2 of the Early Warning ACD Analysis section.
2. Incorporate the newly installed monitoring wells (M72-UBF and M73-LBF) into the established monitoring program for the fault for the USDW and fault monitoring wells.

Florence Copper believes this proposal to be responsive to the USEPA request for an ACD demonstration and associated contingency actions. Florence Copper hereby requests that the USEPA incorporate these elements into the UIC Application.

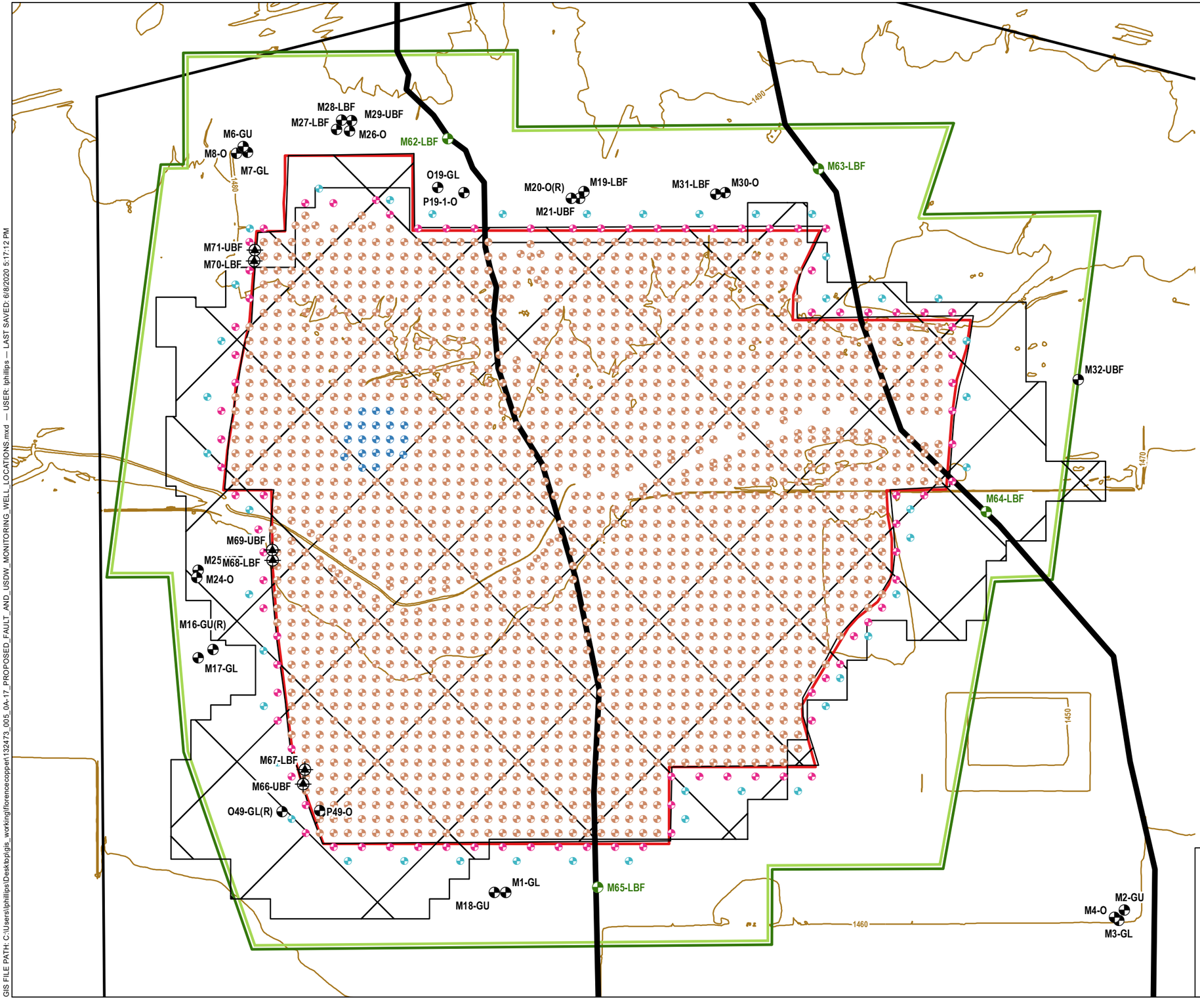
Please contact me at 520-316-3710 if you require any additional information.

Sincerely,
Florence Copper Inc.

Brent Berg
General Manager

cc: Maribeth Greenslade, Arizona Department of Environmental Quality

Enclosures:
Figure A-17 – Proposed Fault and USDW Monitoring Well Locations
Figure A-19 – Typical Observation and Perimeter Well Configuration



LEGEND

- USDW MONITORING WELL
- FAULT MONITORING WELLS
- POINT OF COMPLIANCE WELLS
- PTF CLASS III WELL
- BHP CLASS III WELL
- PTF CLASS III WELL
- PROPOSED INJECTION / RECOVERY WELL
- PROPOSED OBSERVATION WELL
- PROPOSED PERIMETER WELL
- FAULT
- RESOURCE BLOCK
- TOPOGRAPHIC CONTOUR, 10-FOOT INTERVAL
- PROPOSED AOR / FORMER BHP AOR
- AQUIFER EXEMPTION BOUNDARY
- ISCR WELL FIELD
- FLORENCE COPPER PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE

2. TOPOGRAPHIC CONTOUR SOURCE: FLORENCE COPPER, OCTOBER 2010

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SCALE IN FEET

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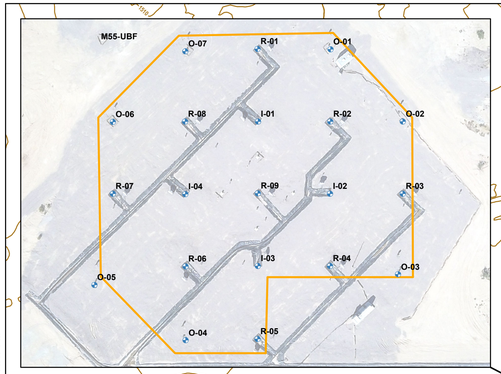
FLORENCE, ARIZONA

PROPOSED FAULT AND USDW MONITORING WELL LOCATIONS

JUNE 2020

FIGURE A-17

GIS FILE PATH: C:\Users\phillips\Desktop\gis_working\florencecopper\132473_005_0A-17_PROPOSED_FAULT_AND_USDW_MONITORING_WELL_LOCATIONS.mxd — USER: lphillips — LAST SAVED: 6/8/2020 5:17:12 PM



M8-O
M62-LBF
O19-GL
P19-I-O
M20-O
M63-LBF
M30-O
M33-UBF
O49-GL(R)
M71-UBF
M70-LBF
M22-O
M14-GL
M72-UBF
M73-LBF
M64-LBF
M69-UBF
M68-LBF
M24-O
M67-LBF
M66-UBF
P49-O
M1-GL
M65-LBF
M4-O

PROPOSED PROCESSING AREA
PTF WATER IMPOUNDMENT
PTF PROCESSING AREA
PROPOSED PLS POND
EXISTING WATER IMPOUNDMENT
PROPOSED WATER IMPOUNDMENT 5
PROPOSED WATER IMPOUNDMENT 4
PROPOSED WATER IMPOUNDMENT 3

LEGEND

- OBSERVATION WELL
- PERIMETER WELL
- PROPOSED INJECTION / RECOVERY WELL
- POINT OF COMPLIANCE WELL
- PTF CLASS III WELL
- USDW MONITORING WELL
- FAULT MONITORING WELL
- ACD DEMONSTRATION WELL
- FAULT
- UNDERGROUND WORKING
- 100 YEAR FLOOD PLAIN
- RESOURCE BLOCK
- 10 FOOT TOPOGRAPHIC CONTOUR
- PROPOSED WATER IMPOUNDMENT
- PTF WATER IMPOUNDMENT
- PTF PROCESSING AREA
- PROCESSING AREA
- ISCR WELL FIELD
- PROPOSED AOR / FORMER BHP AOR
- AQUIFER EXEMPTION BOUNDARY
- STATE MINERAL LEASE BOUNDARY
- FLORENCE COPPER PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE

2. TOPOGRAPHY DATA BY FLORENCE COPPER, OCTOBER 2010. 10-FOOT INTERVALS SHOWN.

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0 70 140 210 280

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TYPICAL OBSERVATION AND PERIMETER WELL CONFIGURATION

FLORENCE COPPER

SEPTEMBER 2020

FIGURE A-19

GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Florence Copper\132473 Florence Groundwater Permitting\GIS\Maps\2020_09\132473_005_000A-19_TYPICAL_OBSERVATION_AND_PERIMETER_WELL.mxd — USER: khensen — LAST SAVED: 11/16/2020 4:44:47 PM